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Functions of amine oxidases in plants and inhibitory effect of them in cancer

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Abstract

Amine oxidases (AOs) present a class of enzymes, which are divided into two main groups based on chemical nature of the attached cofactor, including the AOs containing flavin adenine dinucleotide, (FAD-AOs, EC 1.4.3.4) and copper-containing amine oxidases, (CuAOs, EC 1.4.3.6), which have a g htly bound copper ion in their molecule. FAD-AO_S and $CuAO_S$ present in all kinds of organisms such as bacteria, yeasts, mushrooms, various plants, and animals and catalyse the oxidative deamination of mono- and polyamines (essential compounds for cell growth and proliferation). Therefore, amine oxidases and products deriving from amines oxidation are essential in physiological processes. In plants H_2O_2, deriving from amines oxidation, has been correlated with cell wall maturation and lignifications during development, cell wall strength induction during pathogen infection, cell death induction during hypersensitive response and expression of defence genes. Aldehydes driving from amines oxidation involved in secondary metabolite synthesis and abiotic stress tolerance. Because of the higher content of biogenic amines in tumour cells in comparison to normal cells, AOs could behave as anticancer agent via apoptosis induction by H_2O_2production.

Keywords: Flavin adenine dinucleotide containing amine oxidases, copper-containing amine oxidases, development, defence, apoptosis